GROUP III-NITRIDE BASED RESONANT CAVITY LIGHT EMITTING DEVICES FABRICATED ON SINGLE CRYSTAL GALLIUM NITRIDE SUBSTRATES

Abstract of the Disclosure

[0129] In a method for producing a resonant cavity light emitting device, a seed gallium nitride crystal (14) and a source material (30) are arranged in a nitrogen-containing superheated fluid (44) disposed in a sealed container (10) disposed in a multiple-zone furnace (50). Gallium nitride material is grown on the seed gallium nitride crystal (14) to produce a single-crystal gallium nitride substrate (106, 106'). Said growing includes applying a temporally varying thermal gradient (100, 100', 102, 102') between the seed gallium nitride crystal (14) and the source material (30) to produce an increasing growth rate during at least a portion of the growing. A stack of group III-nitride layers (112) is deposited on the single-crystal gallium nitride substrate (106, 106'), including a first mirror sub-stack (116) and an active region (120) adapted for fabrication into one or more resonant cavity light emitting devices (108, 150, 160, 170, 180).